

## CLAIMS

We claim:

- 1 1. An apparatus comprising:  
2 a therapeutic guidewire; and  
3 at least one optical fiber disposed through the therapeutic guidewire, the optical  
4 fiber configured to provide diagnostic information before, during, and after a  
5 therapeutic treatment.
- 1 2. The apparatus of claim 1 wherein the at least one optical fiber is exposed within  
2 a vasculature of a patient at least at one location along the therapeutic guidewire.
- 1 3. The apparatus of claim 2 wherein the at least one optical fiber is configured to  
2 sense vessel and blood characteristics.
- 1 4. The apparatus of claim 3 wherein the vessel and blood characteristics are  
2 selected from the group consisting of hemodynamic characteristics, hematological  
3 parameters related to blood and blood components and thermal parameters of the  
4 vasculature.
- 1 5. The apparatus of claim 1 wherein the therapeutic guidewire is operatively  
2 coupled to a catheter.
- 1 6. An apparatus comprising:  
2 a therapeutic guidewire configured to operatively receive a treatment device;  
3 and

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4 at least one optical fiber disposed within the therapeutic guidewire to sense  
5 vessel and blood characteristics.

1 7. The apparatus of claim 6 wherein the treatment device is selected from the  
2 group consisting of intravascular device, intraluminal device, intraductal device and  
3 intraorgan device.

1 8. The apparatus of claim 6 wherein the at least one optical fiber is movable within  
2 the therapeutic guidewire.

1 9. The apparatus of claim 6 wherein the at least one optical fiber is exposed within  
2 a vasculature of a patient at least at one location along the therapeutic guidewire.

1 10. The apparatus of claim 6 wherein the vessel and blood characteristics are  
2 selected from the group consisting of hemodynamic characteristics, hematological  
3 parameters related to blood and blood components and thermal parameters of the  
4 vasculature.

1 11. The apparatus of claim 6 wherein the therapeutic guidewire comprises:  
2 an elongated guidewire body having a distal core section axially coupled to a  
3 proximal core section by a connecting member; and  
4 an atraumatic distal tip formed at a distal end of the distal core section.

1 12. The apparatus of claim 11 wherein the therapeutic guidewire further comprises  
2 a flexible coil disposed about the distal core section of the elongated guidewire body,  
3 the flexible coil coupled to at least one point along the distal core section.

1 13. The apparatus of claim 11 wherein the therapeutic guidewire further comprises  
2 a shaping ribbon coupled to the distal core section.

1 14. The apparatus of claim 11 wherein the at least one optical fiber is coupled to the  
2 elongated guidewire body at least at one point along thereon.

1 15. The apparatus of claim 11 wherein the at least one optical fiber is movable  
2 within the elongated guidewire body.

1 16. The apparatus of claim 11 wherein the distal core section has at least one  
2 opening to allow the optical fiber to be exposed to a vasculature of a patient.

1 17. The apparatus of claim 16 wherein the at least one optical fiber is configured to  
2 sense vessel and blood characteristics selected from the group consisting of  
3 hemodynamic characteristics, hematological parameters related to blood and blood  
4 components and thermal parameters of the vasculature.

1 18. The apparatus of claim 5 wherein the at least one optical fiber is marked with a  
2 radiopaque substance.

1 19. The apparatus of claim 12 wherein the atraumatic distal tip includes a clear  
2 polymeric material sheath coupled to the distal end of the flexible coil.

1 20 The apparatus of claim 11 wherein the atraumatic distal tip is formed by using a  
2 metal.

24. A method of sensing vessel and blood characteristics, the method comprising:
- inserting an apparatus into a vasculature of a patient, the apparatus comprising a therapeutic guidewire and at least one optical fiber disposed therein, the optical fiber configured to provide diagnostic information before, during, and after the therapeutic treatment;
- advancing the apparatus to a desired location in the vasculature;
- operating a data processing system coupled to the apparatus such that light signals are transmitted to the desired location in the vasculature and reflected light signals are collected by the data processing system; and
- processing the reflected light signals to provide vessel and blood characteristics.

- 1 25.. The method of claim 24 wherein the vessel and blood characteristics are
- 2 selected from the group consisting of hemodynamic characteristics, hematological
- 3 parameters related to blood and blood components and thermal parameters of the
- 4 vasculature.

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